

BAKER (H.B.)

GENERAL SANITATION.

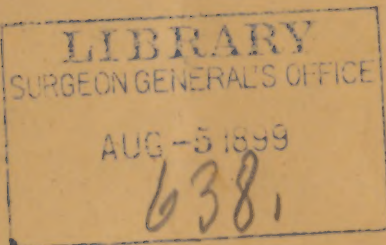
Its Importance to the Public Welfare, and a Plea for Better Methods.

By

HENRY B. BAKER, M. D.,

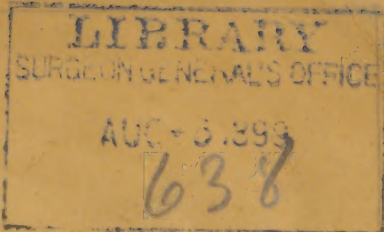
LANSING, MICH.

Sec? Mich. State Board of Health.



Grand Rapids Eagle

FEBRUARY 18, 1880.



The following discussion, one of the most suggestive, thoughtful, practical and plain, yet scientific, on the topic of General Sanitation, ever produced in our State, was given at the State Sanitary Convention last night by Dr. Henry B. Baker, of the State Board of Health. The *Eagle* gladly publishes it entire, believing that it could not do more service for the community by any other use of its columns:

The subject of general sanitation, assigned to me by the committee, is one so wide in extent, and so profound, that I cannot hope to do justice to it as a whole; therefore, realizing the fact that a long and heavy load is frequently lifted with greatest ease when only one end is required to be raised at a time, and especially that when one end of a load is already well raised the most important work is the raising of the other end, I have decided to glance at the general character, scope and importance of the work, ask more particular attention to such parts as in my opinion are most sadly neglected in Michigan at this time, and plead for better methods and more methods than are now employed, especially in certain neglected departments of general sanitation. In doing this, it seems almost essential to consider the character, necessary acquirements, and duties of those who are to do sanitary work; and these are the officers and members of local boards of health, particularly the health officers.

The end of the general subject assigned to me, which I propose to lift on at this time, in accordance with the expressed wish of the committee and with my own judgment, relates mainly to the restriction and prevention of diseases which endanger the public health, and whose causes and modes of communication and best methods of prevention are not generally well understood. It may be said in passing that the department of public sanitation which I consider to have already received the greatest attention is that which relates to general cleanliness, the removal of filth, in the many disagreeable forms in which it has forced itself upon public attention by reason of its intrinsic power of odor or unsightliness. Such nuisances exhale powerful arguments for their own abatement, and although there is yet room for an immense amount of work to secure this removal, those who habitually resist or disregard such arguments are lower in the scale of civilization than they to whom I appeal for the restriction and prevention of communicable diseases, and in regard to other less recognized sources of disease. Some of the dangerous agents to which I wish to call your attention are the contagia of diseases. These are just as real as are the evident nuisances, but they are as a rule invisible to the naked eye; and, though they sometimes generate odors, they are themselves usually without odor. And yet, though their power is not evident to the unaided senses, the earth is strewn with the dead because of these disease-germs, and all our paths of life are peopled with crippled victims of the many communicable diseases which we neglect to prevent or restrict.

NEW REQUIREMENTS AND DEFINITIONS OF CLEANLINESS.

In speaking of the greater importance in the prevention of diseases, of other work than that for the suppression of ordinary nuisances, the question has been asked if I was not forsaking the time-honored doctrine that all our ills are due to filth, and that the single word *cleanliness* expressed the whole sum and substance of general sanitation. To this I reply that very considerable progress has been made in our accurate knowledge respecting the causes of many diseases, and respecting the conditions essential to differ-

ent kinds of cleanliness. To illustrate this, it may be sufficient to suggest different standards of cleanliness as follows: The housewife has one standard of cleanliness, which requires that a dish for the table must be thoroughly washed with soap in hot water, rinsed with clear water, and drained or wiped dry with a clean cloth. If such a clean dish be given to the chemist for his most accurate work, he may object that the dish is not chemically clean; and he will rinse it in alcohol or in a strong acid, or a strong alkali, according to the particular form of matter which he fears makes it "unclean" for his purposes, after which he also will pronounce it clean. If this same dish which has been made clean enough for the chemist, be given to the biologist who is experimenting on the vitality or reproduction of bacteria, he will pronounce it unclean for his purposes, and he will not be satisfied until he has submitted it to boiling water for at least five minutes, or in dry air to a temperature of 240 deg. or 250 deg. F., and then he will require that it shall not be exposed for an instant to the ordinary air, for fear of its contamination by germs which sometimes float in the air. He will insist on these conditions because he has found by experience that ordinary cloths, ordinary air, and ordinary water generally contain germs capable of reproduction under favoring conditions, and sometimes contain germs capable of reproduction in the bodies of human beings, and of causing such diseases as small pox, scarlet fever, diphtheria, etc. The experiments by Tyndall, Burdon Sanderson, Pasteur and others, on the conditions of life and reproduction of bacteria are of very great practical importance in studies for the prevention of diseases, because they show the facts concerning lower organisms similar to those which are found to multiply in the human body during the course of some of the communicable diseases, and because they tend to reinforce our knowledge of methods of destroying the contagia of some of those diseases, such, for instance, as the virus of small-pox, and the contagium of scarlet fever, which are found to be destroyed under some of the conditions just stated—as by exposure in dry air to a temperature of 250 deg. F. Further experiment may show that a lower temperature is sufficient; and this is to be expected, because of the comparative infrequency of extensive outbreaks of these diseases in the hot summer weather, and also because of the liability of vaccine virus to lose its activity during the heat of summer. Returning to our clean dish, which, with a little variation, might as well have been a clean article of clothing direct from a laundry, or even new goods from a store, I think it is now plain that what is perfectly clean, according to one definition, may be very far from clean according to this view of the subject, and with great certainty may convey the unseen causes of disease to any susceptible person.

NEW METHODS OF SANITATION DEMANDED.

What has just been said makes plain the necessity for new methods of sanitation. It may be well briefly to recapitulate these reasons in a slightly different manner, in order that they may more easily be kept in mind: One essential fact to be noticed is that, although the causes of the communicable dis-

eases are material, "particulate" as it is said, they are invisible to the unaided eye, and consequently our ideas of cleanliness must be so cultivated that we can in imagination follow the dissemination of the specific contagium which we know exists, whether it spreads through the air and is taken in with the breath, is conveyed from hand to hand in shaking hands, from lip to lip in kissing, from one place to another in clothing, new goods, boxes or trunks, or in whatever way it is carried from place to place, or in whatever manner, as for instance by the saliva or expectorations of careless workmen or inmates, it is kept in houses or hospitals. DISEASE GERMS, THEIR SIZE, DISTRIBUTION, ETC.

One who has never seen in the microscope the "particulate" germs of disease, may be aided in such a scientific use of the imagination as has been suggested, by fixing his attention upon a form of contagium in mass sufficient to be appreciable to the unaided eye. In the small-pox vesicle we have the contagium of that disease in considerable quantity; and bovine vaccine virus, as we all know, contains the contagium of cow-pox. If we imagine this to be made up of minute granules, of rounded outline, so minute that twenty thousand of them will be required to extend an inch in length, we shall have an idea which will aid the mind in following the course and spread of disease germs of this nature. We can then easily see how such disease-germs may be floated off by the air, carried in a veil, scarf or handkerchief, be stored or conveyed in the clothing, beard or hair, appear as dust in a room, be sent in a letter or a paper, be boxed up and transported to a distance, washed off in water, carried into a privy, pass through the entire length of a sewer, or the water-pipes which supply pure water, go in the milk-can on its round from house to house, or with the delivery-man from the grocer, baker, market or laundry. This may serve to give us an idea of some of the problems with which the health officer has to deal, in connection with the restriction and prevention of communicable diseases, and some idea of

WHAT A HEALTH OFFICER SHOULD KNOW.

An efficient health officer should have clear ideas of the nature of contagia; he must have a good practical knowledge of the means by which, and the manner in which they are disseminated; he should know the conditions of their reproduction, within or without the body; he should know the conditions of their existence outside the body; and especially of their destruction, for upon this, in connection with what has just been mentioned, depends his success in restricting or preventing communicable diseases.

A MEDICAL OFFICER OF HEALTH.

Some of the cities in Michigan do not obey the law which requires that the health officer shall be a physician. No man can be of much use as a health officer unless he has a good knowledge of biology, at least of the general principles. We might better put a blacksmith in charge of a milliner's shop than to choose as our health officer one who does not understand the nature of those vital actions which human bodies undergo in health, and of those processes which are

coincident with disease. While much of the knowledge of the physician is entirely inapplicable to the work of public sanitation, and while this work demands of a health officer much knowledge which the ordinary physician has had no occasion to acquire, still the fact remains that in order to become a useful health officer, one must have had a thorough training in the biological sciences which lie at the foundation of the medical sciences.

A health officer should be sufficiently familiar with mycology not only to know that certain kinds of fermentation are ordinarily harmless, and certain other kinds are generally harmful, but he should know how to stop the harmful fermentation. Inasmuch as nearly all the ferments are invisible to the naked eye, a health officer must have an educated imagination in order successfully to deal with his everyday work. This is so because much of his work should be a battle with some of the special ferments. Perhaps I can make this plainer by briefly outlining what, in the present state of our knowledge, seem to be essential facts in this connection. Active cells in the human body act as ferments, destroying organic matter used as food, and creating special products differing according to the function of the particular organ in which the action takes place. In the healthy adult, the requirement seems to be mainly to get from the food employed force to use in brain-work and muscle-work, very little being then required for growth or development of the body, so that the process is one of destruction through fermentations which yield force, for the purposes of life, and poisonous products which should be thrown out of the body as fast as formed, and which should not be again taken into the body. A health officer should endeavor to see that all is done that can be done to prevent their being supplied to the people again in the water they drink, the air they breathe, and the food they eat.

Immediately upon entrance into the mouth of a healthy adult person, starchy articles of food are attacked by one of the useful body ferments, in the saliva, and starch is converted into one form of sugar. And here, upon the very threshold as it were, may begin the battle between useful and harmful ferments; indeed it may begin in the food before it is put in the mouth, for the yeast which the cook puts in the dough may contain other ferments than the harmless yeast plant, and therefore the bread may contain not only the products of other ferments than yeast proper, but also the special ferments themselves, multiplied greatly in number since they left their home in the foul air, or well-water. So, also, with the meat, which, however, is not fermented by the yeast-plant, but is decomposed in a manner somewhat similar, by bacteria and similar low organisms microscopic in size. And here the product is not so frequently sugar and alcohol, but sulphureted and phosphoreted hydrogen, butyric and carbonic acids, ammonia, etc., usually bad-smelling products; and the bad odor of the product should warn us of danger from those germs which produce decomposition.

In order better to appreciate the importance of the subject, perhaps some other of the useful ferments of the body should be mentioned. We have noticed only the first one encountered by the food in the saliva of the mouth. The food meets another in the healthy stomach, another in the secretions from the pancreas, and so on in different parts of the body. Suppose each and every one of these natural ferments in the body has to divide the food with another special ferment which goes into the body with the water or food, or enters the blood in some other way, as is believed to be the case in most communicable diseases. Suppose that special ferment to be the one which causes small-pox,

the one which causes diphtheria, or the one which causes typhoid fever. We can thus see how the gases given off by the lungs, and how the other excretions, and the secretions of the body may all contain products not naturally present in them, and a person not only have a fever but be "sick all over" in every part of the body. The character of the sickness, from a communicable disease, depends, as we know, upon the particular special ferment, but we need to guard, and to have our health authority guard us, against danger from every one of these contagious and infectious ferments.

HEALTH OFFICER NEEDED FOR EVERY LOCALITY.

It is important that all classes of people understand what needs to be done by the health officer, because he is a public servant dependent upon all classes of people, sometimes for his official position, and always for that co-operation which will render his efforts most effective.

If the people of a locality do not think of anything for a health officer to do, they will not be likely to employ one, except as a form in order to comply with the State law, and will then endeavor to get the cheapest man. A prominent newspaper in Detroit states the case as follows: "It is doubtful if any board of health, however elaborate and costly, could at present improve the public health of so healthy a city. While therefore we may be compelled to have a health officer, as the law seems to require, to report our vital statistics to Lansing, the common council should take care that he cost as little as possible, and meddle as little as possible with the people's private affairs."

The writer of that paragraph assumes that Detroit is a healthy city. I know of no way of proving what he assumes, because the city has no reliable vital statistics; but the reports of burials in the city cemeteries indicate that the deaths from communicable diseases are about two hundred and forty (240) every year. How long must this slaughter go on before it will attract the attention of the newspapers? When General Custer's little band, numbering about the same as this, was destroyed, the news thrilled the people of this State with an awful anguish; but here are two hundred and forty (240) deaths from preventable causes in a city repeated every year, and that city so healthy that its only need of a health officer is to report on vital statistics to Lansing, and the council is asked to hire a cheap man to do that. This illustrates the necessity for more accurate and more general information concerning the deaths and the causes of deaths which are now permitted to destroy people by the hundreds, without attracting sufficient attention to start efforts for their prevention. We need vital statistics, and we also need to act up to the knowledge we already have as to methods of preventing the communicable diseases.

HOW DO HARMFUL FERMENTS ENTER THE BODY?

In order to be able to guard us from the communicable diseases, the health officer should know the sources of danger, and the probable ways in which different diseases enter the body. Much remains to be proved in this field of study, but concerning certain diseases there is much that seems well established.

TYPHOID FEVER.

There is good evidence that the greatest danger from typhoid fever comes from what goes into the stomach, and not from the air taken into the lungs, and that of all sources probably the most frequent is water contaminated with the discharges from persons who have had the disease, though an epidemic of about 200 cases in Germany has been traced to the eating of the meat of a calf which had probably been affected with

the disease. The poison of the disease seems to be reproduced in the intestine and not usually on the outer surface of the patient. In typhoid fever then the health officer need not quarantine or isolate the patient, for it is not common to have the disease spread by breathing the same air in which the sick person is; but the health officer should carefully superintend some of the details in every case of typhoid fever. He should require the discharges from the bowels of the patient to be thoroughly disinfected, and not permit them to go into any accumulation of excreta from where they may eventually return to plague the human race.

It had been thought that typhoid fever has sometimes been caused by breathing in the ferment given off from decomposing organic matter; and diarrheal diseases have been known to be caused in a similar manner, although it has not been demonstrated that the ferment was itself inhaled. Generally we have a right to assume, however, from the evidence of observed facts, that wherever we find the odors of decomposition in connection with organic matter, there also are the special ferments of that particular decomposition, unless unusual circumstances have caused a separation; for the bacteria of decomposition are exceedingly minute, and their germs appear constantly to float in the air of foul places. The health officer should be required to search out all such places, and to abate any such nuisances. By means of lectures and circulars, and otherwise he should interest all classes as to the best means of preventing the disease. If he prevents typhoid fever, he will prevent about five per cent. of all the deaths which now occur from all causes; and he will save his city from a great waste of life and money.

SMALL-POX.

Small-pox is now usually of little consequence, as it does not cause many deaths in intelligent communities, and its prevention is easy by timely vaccination and revaccination. But it is worth while to understand that its cause probably does not usually enter the body as does that of typhoid fever—by the mouth—but the special ferment is generally inhaled with the air we breathe. And the special ferment is reproduced on the outer surface of the patient. It is therefore important to isolate persons who have small-pox, and to destroy or disinfect not only the discharges, but everything which has been in a room with a person sick with that disease. An active health organization in a city where people are generally intelligent, should, in this enlightened age, be ashamed to have an epidemic of small-pox. I am informed that in one city in this State where there is a paper mill, seldom a year passes that a case of small-pox does not occur, but the intelligent health officer generally restricts it to the first case, and has never had more than two or three cases in the outbreak.

SCARLET FEVER.

Scarlet fever is a disease of much greater importance in this State than is small-pox. Whenever our health authorities shall protect us from scarlet fever we will be spared a very considerable proportion of our present death-rate, and a vast amount of suffering which now follows children through life; for scarlet fever leaves many who linger on through years of imperfect life. In this disease, as in small-pox, the special ferment seems to be reproduced on the outer surface of the body, perhaps, also in the throat and throughout the body, so that the discharges and everything which comes near the body should either be disinfected or destroyed.

DUTIES OF THE HEALTH OFFICER IN CONNECTION WITH SCARLET FEVER, ETC.

The health officer should next to the attending physician be the first to visit the premises where scarlet fever occurs, and in

the interest of the community should superintend and enforce measures for the restriction of the disease. The physician is employed and paid only for the benefit of the family who employs him. If the community expects to have its interests subserved, it must employ and pay some one to attend to them. The health officer should put up a notice, to warn those who might otherwise enter into danger. He should leave with the family plainly printed instructions, and before he leaves he should make sure that the methods for the restriction of the disease are understood by the family. A city might even better pay skilled nurses to remain with the sick with a view to preventing the spread of the disease than have such a disease as scarlet fever spread through the city with all the chances for its germs to remain for all time to come to break out again whenever a sufficient number of children come to be of the most susceptible age.

DIPHTHERIA.

Diphtheria is another disease which is being allowed to destroy the children in this State, in some parts of the State without any proper effort for its restriction. Its special poison is believed to enter the body by way of the mouth and air-passages, and to be communicated by whatever comes in contact with the exhalations and excretions from the body of the sick person.

In the restriction of diphtheria, and of the other communicable diseases, except small-pox, which can be modified or prevented by vaccination, there is a great and generally neglected field for active work by our health authorities, throughout the State, and in every year. About one-eighth of all the deaths reported in this State are reported as caused by the communicable diseases. Among these diseases few cause a less number of deaths than does small-pox, but, aside from vaccination, the methods adopted for its restriction are generally applicable to all the others, except perhaps typhoid fever, of which mention has already been made.

THE ECONOMY OF HAVING A HEALTH OFFICER.

The State Board of Health has the names and post office addresses of over 3,500 physicians in Michigan. I think it is safe to estimate that the average annual income of these doctors is at least \$1,000 each; and, if so, the people of this State pay \$3,500,000 a year to those whom they employ to prescribe for the sick. If in respect to sickness we admit that an "ounce of prevention is worth a pound of cure," one-sixteenth of \$3,500,000 judiciously expended in the prevention of sickness would be worth as much to the people as the whole sum spent for the cure of sickness; or if the whole 3,500 doctors were employed and the whole \$3,500,000 expended in the prevention of sickness, the benefit to the people would be sixteen times as great as now and would have a money value of \$56,000,000. And yet not all the sickness is preventable. The debt of nature must be paid at last. When science has failed to prevent sickness the skillful physician can often aid in nature's efforts to recover strength, and when death is certain he can often make easier the last days of suffering. But can any rational person suppose for an instant that if one-sixteenth of the 3,500 physicians now employed in prescribing for the cure of disease were constantly employed and paid for their services and their success in searching out and applying all possible knowledge for the prevention of sickness and deaths, it would require near all the remaining 3,282 physicians to prescribe for the sickness which would not thus be prevented? Can any one suppose that many of the present heavy burdens of the people would not be removed?

Omitting mention of the most important direct benefits of the prevention of sickness

and noting only the indirect benefits not so frequently dwelt upon, let us think of the vast sums of money paid to maintain poor-houses, hospitals, insane asylums, asylums for the deaf, dumb and blind, jails, and even prisons; much of this expense would then be entirely unnecessary; and many of the causes for demands now made for private charity would not exist; thus, as I believe, not only our personal expenses but our State, county and municipal taxes would be materially lessened, the prosperity of our people would be something wonderful when compared with our present condition, and the phrase, "life, liberty, and the pursuit of happiness," would have its first and last terms wonderfully emphasized.

There is no reason to fear that we should suffer for want of doctors, even if we were to ask everyone of those now practicing to change his employment to the prevention of sickness. If more were needed I think they would be forthcoming; but suppose every one of the 1,261 local boards of health in this State should constantly employ one physician as a health officer, there would still remain 2,240 doctors to attend to the sickness which the other third failed to prevent; and the 1,261 physicians who would then be constantly employed as health officers of local boards of health would cost for permanent salaries only a small part of the \$3,500,000, which is now estimated to be paid to physicians.

The main reason why we need an active health officer who understands his business, in every city, village and township, is that the people do not now seem to know the preventable nature of the diseases which kill them. In many places they stand by like dumb animals, and suffer their children to die of diphtheria and other communicable diseases, and never lift a finger to try to prevent the spread of these diseases. This apathy and ignorant or wilful disregard for human life is not confined to the rural districts, but is seen in cities.

PRACTICAL ILLUSTRATIONS.

In Detroit, the burials in the city cemeteries indicate that the deaths number about 2,000 in each year. Of this number, the deaths from diseases usually included among those which endanger the public health, and which therefore are both by the law and by sanitarians regarded as preventable, usually numbers about 240, which is twelve per cent. of the total deaths reported. And this does not include consumption, pneumonia, or diarrhoea, many deaths from which diseases I believe could be prevented. If we conclude that under good effective sanitary work, the sickness could be reduced by ten per cent, the 200 physicians of whom we have the names in Detroit might safely be reduced by that proportion; and if the twenty doctors thus thrown out of employment were employed by the city in the work of general and special sanitation, I firmly believe that it would be in the direction of true economy for the citizens of Detroit. And when I plead for sanitary work, it is not for such work as may be done by a number of city physicians, whose duties are, first, to attend to their own private practice; second, to attend to the sick poor within their jurisdiction. This is not general sanitation nor work for the prevention of sickness; it is not even preventive medicine; it is the same old idea of trying to cure what should have been prevented; it is like locking the stable door after the horse is stolen, and is frequently a waste of time and money, because the communicable diseases are generally as yet self-limited diseases which run their course under any treatment, though such care as a skillful physician may prescribe may sometimes save life.

The following letter may be put in evidence as to what is really done in Detroit:

CITY OF DETROIT,
CLERK'S OFFICE, Feb. 2, 1880.

Secretary of State Board of Health:

DEAR SIR: Forms for making reports of Board of Health to your office received. The Board of Health of Detroit have not met during the past year, so I am unable to give the information requested. It is probable that they will hold no more meetings.

Yours respectfully,

HARRY S. STARKEY,
Asst. City Clerk.

A subsequent letter from the same gentleman stated that there was no clerk of a board of health, no board of health, and no health officer.

The Board of Health in the city of Detroit has not met during the past year! And yet we know there have been hundreds of cases of sickness and many deaths in that city from causes believed to be preventable. We see accounts of frequent meetings of the different medical societies of Detroit and of their flourishing condition. There are excellent physicians in Detroit, and good hospitals; there are medical colleges, and, as I am told, there is plenty of material for clinical illustrations of all sorts of disease; but the board of health has "not met during the past year!" We have, as I have stated, the names of about 200 physicians in Detroit. I presume there are more than that number. Let us suppose that the two hundred physicians have an average annual income, from their practice, of only one thousand dollars each—then the citizens of Detroit pay two hundred thousand dollars a year to those who prescribe for cases of sickness. And yet we are officially informed that the board of health in that city has "not met during the past year." I suppose its motto on this subject may fairly be stated: *Two hundred thousand dollars for the cure of disease, but not one thousand for its prevention.* Under such circumstances, I do not wonder that the city is ashamed to publish a report of deaths and causes of deaths, and that we find it impossible to get such official statistics from Detroit, though we have no difficulty in securing such reports of the mortality in many of the principal cities in this and in other countries.

The health officer of Bay City is not a physician, as the law requires where this is practicable. He says the physicians do not report to him, and that he is entirely unable to make the reports to the State Board which are required under the law. He says there are in Bay City about forty physicians, that their annual incomes will average at least \$2,000 each. That is, the people of Bay City pay \$80,000 a year to physicians. Suppose ten per cent. of those physicians were employed and paid by the city to labor for the prevention of disease, and held morally responsible for the occurrence of preventable diseases. Then four physicians would be thus constantly employed, and paid \$2,000 each per year, thus diverting \$8,000 out of the \$80,000. Does any one doubt that this sum would be saved from the \$80,000 now necessary to be expended in paying physicians for the cure of sickness? Possibly it might not decrease the sickness ten per cent. the first year, but I firmly believe that if continued it would be a paying investment in the end, for the physicians so employed would gradually become sanitarians; and in order for this to be a paying investment the first year, it is not necessary that the sickness be reduced by 10 per cent., because the doctor's fee is frequently only a small part of the expense of sickness.

I suppose most of those present know the facts as regards this city of Grand Rapids, of which I am not to speak at this time.

Coming nearer to Grand Rapids, however, than Detroit or Bay City, the following letter states the condition of things in Grand Haven:

RECORDER'S OFFICE,
CITY OF GRAND HAVEN, Feb. 2, 1880.
Henry B. Baker, Esq., Secretary State Board of

Health, Lansing, Mich:

DEAR SIR: It will be utterly impossible for me to send you anything in the shape of an official report, for the reason that our Board of Health have utterly ignored the laws of the State relating to sanitary matters. We have had a great number of cases of diphtheria, scarlet fever, and measles in our city during the year 1879, but not reported to the Board of Health as far as I know.

Very respectfully,

Thos. F. Howe,
City Recorder.

In Detroit, in Bay City, in Grand Haven, and perhaps in other cities in Michigan, it seems to be considered too expensive to have a health officer and pay him, as should be done, two thousand dollars a year, and require his entire energies to be put forth for the prevention of sickness and deaths. I suppose that one reason for this state of things is that to have a health officer requires some action on the part of city officials, and perhaps a vote to pay him his salary, while it is possible, for instance in the city of Detroit, to permit the people of the city to pay \$200,000 a year for physicians without any official action whatever.

We understand very well that there are taxes which come by assessments because of official action—it may be well for us to understand that there are also heavy expenses which may sometimes come upon us without official assessment, and even because of neglect to provide for assessments to prevent such heavy expenses.

The expense for physicians is only a small part of the cost and losses because of sickness. In my plea for better methods I refer to the expense for physicians only, for purposes of illustration, because it is for personal services somewhat analogous to those which would be given by a health officer, and because the facts are easily obtained and their bearing easily understood. I do not see how a rational person can examine the facts, and not be convinced that at least one skilled physician and sanitarian should be constantly employed as a health officer in every city and village in the State, and from time to time in every township.

"KNOWLEDGE IS POWER."

Never yet has the public health service of Detroit, Bay City, Adrian, Jackson, or indeed of any city in Michigan been properly organized for effective and complete work in all branches of the service. The vital statistics of the city, which lie at the very foundation of effective public health service, have never been properly collected. No tables carefully compiled under the immediate supervision of a medical man or vital statistician are regularly published by any city in Michigan. Without such means of knowledge respecting the particular sources of danger to life in Detroit or in any city, it is not probable that the city will ever have the most effective sanitary work. Knowledge is power, in sanitary work as in other pursuits, and the most effective public health service is based upon accurate knowledge of the sources of danger to life and health within the jurisdiction of that service. Complete statistics of deaths, where obtained, supply the knowledge of relative danger to life from each recognized cause of death; and such statistics, properly studied in connection with other facts, also lead to a knowledge of many causes of death not previously known, and which can not otherwise be ascertained.

FOR SUCCESSFUL GENERAL SANITATION,

it is only by organized effort that the best success is attained; what is needed in this city, and in every city, is that the comparatively few who really appreciate the very great importance of this work shall strongly co-operate and be active and energetic in intelligent efforts for the proper organization and work of the public health service. It is a subject which deals with questions upon which our very lives depend, and is so far above all the usual questions of party

politics that all good people should unite to select and retain the very best men it is possible to secure, and to see to it that such men shall be supplied with the money and support necessary to properly maintain an effective public health service. We should remember that the most severe tax to pay is the "debt of nature," and next to that the heavy tax which sickness always entails, and in one way or another forces the collection. These considerations are too often lost sight of by "penny wise and pound foolish" city authorities who grudgingly dole out a few dollars, and sometimes fail to do even that, for the use of the city board of health, the most important organization in the city, and one on whose proper action depends the health, life and happiness of the people who pay the taxes; for although the sickness from preventable causes is usually most severe among the poor and ignorant, communicable diseases are no respectors of persons, and the poorest resident of a back alley may be able to give to the richest citizen the most loathsome, fatal, or rapidly-spreading disease. As "the strength of a chain is the strength of its weakest link," so the health and strength of the people or a community may depend upon the health and strength of the weakest members. In these times of rapid communication among people throughout the world, and close relations of members of communities, no man can live for himself alone; but whether he knows it or not, he has a vital interest in the health and prosperity of his fellow beings.

MISSIONARY SANITARY WORK.

After the student in sanitary science has mastered so much of the physical, medical, social and other sciences as to enable him to be of real use to humanity in his particular sphere, his usefulness will then be somewhat in proportion to his ability to impart the results of his research, experience, observation and study. Therefore one of the most important parts of the work of the leading sanitarian is now, and it seems to me must always be, somewhat akin to the missionary work done by the clergy. The leading sanitarian must first labor until he is convinced that he has gained at least a part of Nature's eternal truth, and he must then rouse people to an appreciation of the direful consequences of their own transgressions; he must point out the better way of life, while he denounces most of the old ways as sinful, degrading, and leading down to death and destruction. Stated in this way, it really seems that the work is a noble one, because intended to advance the best interests of mankind—to promote health and happiness among the people. Perhaps it is for this reason that the sanitarian is so often forced to carry his cross; because we have still with us many people who can persecute the apostle of science in ways which cause pain if not death. People do not seem to like to have their transgression of sanitary laws pointed out to them. This brings me to consider some hindrances to sanitary progress.

HINDRANCES.

In connection with sanitary progress, one phenomenon so generally appears that it is worthy of mention, because it constantly interferes with efforts for improvement in almost every line of work. I refer to the opposition which is almost uniformly met when any necessity for improvement is pointed out—the opposition coming from those most closely related to the nuisance or cause of sickness. This may, at first thought, appear improbable; but I think you will find it true, as a general rule.

If a neighbor or the health authority complains of a nuisance on a man's premises, the owner insists upon it that it is no more a nuisance than is common all about him, and that to complain of it is a mean personal at-

tack upon himself. He resents it as an insult. If, after a careful search for the causes of an outbreak of typhoid fever, you trace all the cases of the disease to exposure to unsanitary conditions at a certain house, or to drinking water from a certain well, the owner of the house or well almost always endeavors to maintain that his house or his well is in good sanitary condition, and that it is absurd to believe that you have found the cause of the sickness in anything connected with his premises.

If after careful investigation it is found that there are sanitary defects incident to certain methods of constructing, heating, lighting, or ventilating school buildings, or to certain methods of study or teaching in our schools, I think that as a rule those who are most closely connected with the schools, and particularly those who feel a certain degree of responsibility for the best possible conditions in our schools, are rather slow to acknowledge any such defects as those pointed out.

This general principle of opposition to change is found in individuals, in systems—such, for instance, as the public school system—and in institutions—such as our State institutions, some of which have been inspected by members of the State Board of Health, sometimes by invitation, but usually to the discomfort of the managers of such institutions, and their opposition to the conclusions of the inspecting officer. Our human nature seems to be opposed to sanitary reforms if prescribed for ourselves by others; we are usually more willing to believe that other people should reform.

NOT THIS CITY, BUT THE RIVAL CITY.

The principle of opposition is particularly noticeable respecting cities. Probably many persons in this city would promptly resent it if I were to say that your city is woefully negligent of the best interests of humanity within its limits, that those sacred interests of life, health and happiness which are entrusted to a local board of health receive little or no attention, while other political interests of much less consequence absorb all the taxes you pay and the entire time and efforts which your city officials use in your interests. Because of this uniform dislike of homely truths which apply to ourselves, I shall not tell you that this is true, but will only say that I know of a city in this State, similar to this in some respects, and which we will call "the rival city," in which the people themselves pay very little attention to sanitary subjects; they give such subjects no serious thought, and the officers whom the people elect fairly represent the people who elect them, and they pay no attention to such subjects, and give them no earnest thought. They do not seem to care whether or not they comply with the State law which requires that the city shall have a health officer, and if they ever appoint one his compensation is insufficient, and he is not required to devote all his energies to his official duties; no thorough attempt is made to collect statistics of deaths, and thus add to the common stock of useful knowledge of the causes of diseases and deaths, and of the best means of avoiding such causes; there is no systematic house-to-house inspection for nuisances, and no prompt action for the abatement of every nuisance; when an epidemic comes it finds the city unprepared, and the cleaning-up process is commenced when it is too late to do anything but harm; cases of typhoid fever occasionally occur, but no sanitary officer searches diligently until he finds and removes the source of the disease; and other people are left in ignorance, to go on and contract the disease if they chance to come under the same dangerous conditions, which to them are unknown and therefore unavoidable.

A case of small-pox occurs, and to avoid a panic or loss of custom to a few merchants

and others, the truth is suppressed, the people are not warned that they must be vaccinated, and an epidemic of small pox occasionally results. Scarlet fever breaks out, but no active board of health has educated the people in the requirements of the law for prompt notice of such diseases, and it is a long time before the board of health receives such "official" information of the outbreak as to be stirred to action; meanwhile many families have buried their loved ones—dead of that disease so dreadful to parents. Diphtheria finally comes. It had prevailed in neighboring places for a long time, but the members of the board of health have not investigated the subject—some of them do not know that it is a communicable disease, and exceedingly dangerous to the public health, though they know that the deaths occur mostly among the children. Many of the doctors call mild cases by other names. Nothing is done to stop its spread, and very soon there are so many sources that it is impossible to trace the spread of the disease by contagion, and the city has one more disease fastened upon it, perhaps for all time to come, though the disease may occasionally die down for lack of material, only to spring up again on the opening of the schools in Autumn, after more children shall have grown up to the most susceptible age.

But this is getting to be a dismal tale. What croaker dare stand up and say that the rival city here described is in any respect similar to this fair city? Fortunately for our temporary ease of mind, but, perhaps, unfortunately for our rapid progress and permanent safety and happiness, no such gloomy talk as this is ever permitted in polite society, and I gladly turn from it.

MONEY VALUES OF IMPROVED SANITARY METHODS.

Mr. Jackson S. Schultz, of New York, has lately said that "from 1822 to 1840, during the summer months, no business could be done in hides and rags," because of the nature of the quarantine, which, however, was the best known at that time; that "the loss to those engaged in commerce and manufactures requiring those articles, must have been at least \$100,000,000—a sum sufficient to sustain all the health boards in the country." Now the quarantine is so managed by experts as to occasion little interruption to commerce or manufactures. He said, "If these trades should be again stopped, it would pay them to establish schools and hospitals for the education of doctors for sometime to come." Perhaps he meant the education of sanitarians or health officers. He is not a physician, but said he spoke "from the point of view of the tradesman." His statements show that after sanitary progress has been made, its importance is recognized by some classes of people. It is to be hoped that the time will soon come when all classes of people can realize the importance of aiding its progress.

If an improved quarantine system in New York is worth \$100,000,000, in eighteen years simply to the business connected with hides and rags, then certainly better methods of sanitation which are applicable to all kinds of business interests throughout our State must be of very considerable importance to be the people of this State. Because whenever a prominent communicable disease such as diphtheria or scarlet fever breaks out in a place, business interests are certain to suffer; and in spite of, and perhaps because of attempts to suppress the knowledge of the outbreak of a communicable disease the disease frequently spreads and finally injures the business of a place far more than it would have done had the case been promptly reported to a board of health whose known efficiency would be a guarantee that the disease would be at once suppressed.

RELATION OF SCHOOLS TO PUBLIC SANITATION.

Business interests in relation to this subject are great, but educational interests are probably greater, at least to the rising generation which is soon to displace us. Under present imperfect methods there seems to be no escape from one of two evils—either the schools continue and spread scarlet fever, diphtheria and other communicable diseases throughout cities and throughout the State, as they are now spreading diphtheria; or the schools are closed, and though the public health, which is of the greatest consequence, is furthered thereby, the whole educational work is for the time broken up. What is worse, this breaking-up process must come still more frequently as time goes on, unless some improved methods are adopted; because modes of intercommunication are becoming more complex. Under present methods the schools are not closed promptly on the outbreak of a communicable disease, but only after the disease is quite general, and as the germs of these diseases remain active for quite a long time, whenever the schools open, at least in the autumn, there is likely to be some pupil prepared to communicate one or more of the infectious diseases.

For the best interests of the schools and for public health, we need an entirely different sort of work from what we now have, a much more thorough, systematic, continuous and rational support of our present laws, which seem to be a long way in advance of the knowledge or practice of the people. Suppose that, instead of suffering as we do, a very considerable proportion of the children sent to school to die or suffer through life from the results of disease contracted in school, or instead of breaking up the schools every year or so, and losing the entire benefits of the school for a considerable time, we were to employ constantly a few experts to do away with both these evils. To me this seems just as practicable as was the improved quarantine in New York city, if only our people will unite in the work. I suppose that the quarantine system of New York city costs about \$100,000 dollars a year; and we have seen that a tradesman estimates the annual saving to only a few trades to be millions of dollars.

HOW CAN THE SCHOOLS GO ON WITHOUT DISSEMINATING DISEASE?

Let us consider some of the work which needs to be done in order that the schools may go on continuously and yet not spread disease.

The three most important general principles of action by the improved New York quarantine are: Isolation of the sick, disinfection of all infected material, and ventilation of everything. In order that this shall be possible in relation to the schools of a city, it is essential to have such a thorough organization of the health authority of a city that suspected cases of communicable disease shall be promptly reported to the board of health and be immediately visited, and the truth learned whether or not the case is one involving danger to the community. The health authority must be given money sufficient to have such work done with as much promptness as the fire department display in visiting the locality of a reported fire; and as the firemen remain until the fire is out, so the health department might have its officer or employe remain until the disease is over. He should watch and guard the public safety. He ought to use disinfectants skillfully, and, if need be, as freely as water, until all danger of a fresh outbreak should be prevented. He should see to it that in no way does the disease spread. Now, we quarantine all, sick and well, by closing the schools. An active health department should at all times have as perfect knowledge of the location of cases of diseases which endanger the people under its protection, as the fire

department does of the buildings which are burning and thus endangering the property under its protection. With such knowledge as this the health department could furnish the teacher of every school in the city with a list of all families in which there was a person sick with a communicable disease, and if necessary an agent of the health department or some other person could act as sentry at each school, and persons liable to communicate disease could be kept out. As an additional precaution even where there has been no known infection, all articles likely to convey disease into the school could be easily disinfected, if it were only a custom to do so and provision were made for such disinfection. It would be easy to have a small room at every school-house where the outer wearing apparel, etc., could be disinfected and aired while the wearer was in school, instead of having, as is now so commonly the case, the clothing of all closely packed in an unventilated closet.

GENERAL BOARDS OF HEALTH.

Some one may question why, in this paper on general sanitation, so little is said about general board of health—State and National. It is not because such boards are not of exceedingly great importance; for in my opinion they are essential to successful general sanitary work; but because they are further removed from the people for whom this paper is intended, and because of the truly democratic character of the health laws of this State, their theory and underlying principles being that

LOCAL NUISANCES SHOULD BE DEALT WITH BY LOCAL AUTHORITIES.

This principle seems to me to be so manifestly sound, that it is unnecessary to dwell upon it; but inasmuch as it is so frequently overlooked, it seems necessary to mention it, briefly: The laws of this State give to local boards of health almost absolute power over everything relating to the restriction and prevention of diseases, the abatement of nuisances, etc., and no such powers are given to the State Board of Health, which has duties no less important, but of a different character. It will thus be seen that local boards of health are justly responsible for preventable

SICKNESS WITHIN THEIR JURISDICTION.

As the local boards of health which have this absolute power and consequent responsibility, are composed of just the men whom the people of each locality choose to have act as the guardians of their lives and health, it seems evident that no progress can be made except the people themselves shall in some way make progress in sanitary knowledge; and as it would be very much like requiring a man to raise himself by his boot-straps to expect that the greatest progress can be made without some outside aid, the laws of this State make provision for the utilization of the best work and experience of each and every local board for the benefit of all the other boards, through a system of annual and special reports to the State Board of Health, which is charged with the duty of collecting and disseminating all sorts of useful information on the causation, prevention, and restriction of diseases and deaths.

It may thus be seen that though the State Board collects useful information from all possible sources, it is more or less dependent upon local boards, for material to compile, collate and utilize for the general good; and its work in diffusing information, and in other directions is advanced by whatever advances the general activity and usefulness of the local boards. We have seen that the local boards are what the people make them. So that what is most essential to progress in public health, and consequent prosperity, is general progress in sanitary knowledge among the people. To those good people in Detroit and Grand Rapids who, with this object in view, have made these Sanitary Conventions possible and successful, are due our

